FAMILY LYCEUM.

PUBLISHED WEEKLY, AT THE LYCEUM PRESS, No. 3, CORNHILL, BY GEORGE W. LIGHT & Co.

VOL. I. BOSTON, SATURDAY, DECEMBER 1, 1832. NO. 16.

FAMILY LYCEUM.

JOSIAH HOLBROOK, EDITOR.

TERMS: Two dollars a year, in advance. Six copies for ten dollars.

THE ANCIENTS.

[Concluded from the last Lyceum.]

SOCRATES.

ANXIOUS to save so valuable a life, they urged him to attempt his escape, or at least to permit them to convey him away; and Crito went so far as to assure him that, by his interest with the jailor, it might be easily accomplished, and to offer him a retreat in Thessaly; but Socrates rejected the proposal as a criminal violation of the laws, and asked them, whether there was any place out of Attica which death could not reach? At length the day arrived, when the officers to whose care he was committed delivered to Socrates early in the morning the final order of his execution, and immediately, according to the law, set him at liberty from his bonds. His friends, who came thus early to the prison, that they might have an opportunity of conversing with their master through the day, found his wife sitting by him with a child in her arms. Socrates, that the tranquillity of his last moments might not be disturbed by her unavailing lamentations, requested that she might be conducted home. With the most frantic expressions of grief she left the prison. An interesting conversation then passed between Socrates and his friends, which chiefly turned upon the immortality of the soul. In the course of this conversation, he expressed his disapprobation of the practice of suicide, and assured his friends that his chief support in his present situation was an expectation, though not unmixed with doubts, of a happy existence after death.—'It would be inexcusable in me,' said he, 'to despise death, if I were not persuaded that it will conduct me into the presence of the gods, who are the most righteous governors, and with the society of just and good men; but I derive confidence from the hope that something of man remains after death, and that the condition of good men will then be much better than that of the bad.' Crito afterwards asking him, in what manner he wished to be buried? Socrates replied with a smile, 'As you please, provided I do not escape out of your hands.' Then, turning to the rest of his friends, he said, 'Is it not strange, after all that I have said to convince you that I am going to the society of the happy, that Crito still thinks that this body which will soon be a lifeless corpse, is Socrates? Let him dispose of my body as he pleases, but let him not at its interment mourn over it, as if it were Socrates.' Towards the close of the day he retired into an adjoining apartment to bathe; his children in the meantime expressing to one another their grief at the prospect of losing so excellent a father, and being left to pass the rest of their days in the solitary state of orphans. After a short interval, during which he gave some necessary instructions to his domestics, and took his last leave of his children, the attendant of the prison informed him that the time of drinking the poison was come. The executioner, though accustomed to such scenes, shed tears as he presented the fatal cup.—Socrates received it without change of countenance, or the last appearance of perturbation; then offering up a prayer to the gods, that they would grant him a prosperous passage into the invisible world, with perfect composure swallowed the poisonous draught. His friends around him burst into tears.—Socrates alone remained unmoved. He blamed their pusillanimity, and entreated them to exercise a manly constancy worthy of the friends of virtue. He continued walking till the chilling operation of the hemlock obliged him to lie down upon his bed. After remaining for a short time silent, he requested Crito, probably to refute a calumny which might prove injurious to his friends after his decease, not to neglect the offering of a cock which he had vowed to Æsculapius; then, covering himself with his cloak, he expired. Such was the fate of the virtuous Socrates! A story, says Cicero, which I never read without tears. The friends and disciples of this illustrious teacher of wisdom were deeply afflicted by his death, and attended his funeral with every expression of grief. Apprehensive, however, for their own safety, they soon afterwards privately withdrew from the city, and took up their residence in distant places. Several of them visited the philosopher Euclid of Megara, by whom they were kindly received. No sooner was the unjust condemnation of Socrates known through Greece, than a general indignation was kindled in the minds of good men, who universally regretted that so distinguished an advocate for virtue should have fallen a sacrifice to jealousy and envy. The Athenians themselves, so remarkable for their caprice, who never knew the value of their great men till after their death, soon became sensible of the folly as well as criminality of putting to death the man who had been the chief ornament of their city and of the age, and turned their indignation against his accusers. Melitus was condemned to death; and Anytus, to escape a similar fate, went into a voluntary exile. To give a farther proof of the sincerity of their regret, the Athenians for a while interrupted public business; decreed a general mourning; recalled the exiled friends of Socrates, and erected a statue to his memory in one of the most frequented parts of the city. His death happened in the first year of the ninety-sixth olympiad, and in the seventieth year of his age. Socrates left behind him nothing in writing; at least, nothing that has reached us, though he wrote a great deal; but his illustrious pupils Xenophon and Plato have in some measure supplied this defect. The memoirs of Socrates, written by Xenophon, afford, however, a much more accurate idea of the opinions of Socrates and of his manner of teaching, than the dialogues of Plato, who every where mixes his own diction with the ideas and language of his master. It is related, that when Socrates heard Plato recite Lysis, he said, 'How much does this young man make me say which I never conceived!' His distinguished character was that of a moral philosopher, and his doctrine concerning God and religion was rather practical than speculative. But he did not neglect to build the structures of religious faith upon the firm foundation of an appeal to natural appearances. He taught that the Supreme Being, though invisible, is clearly seen in his works; which at once demonstrate his existence and his wise and benevolent providence. He admitted, besides the one Supreme Deity, the existence of beings who possess a middle station between God and man, to whose immediate agency he ascribed the ordinary phenomena of nature, and whom he supposed to be particularly concerned in the management of human affairs. Hence he declared it to be the duty of every one, in the performance of religious rites, to follow the customs of his country. At the same time he taught that the merit of all religious offerings depends upon the character of the worshipper, and that the gods take pleasure in the sacrifices of none but the truly pious. Concerning the human soul, the opinion of Socrates, according to Xenophon, was, that it is allied to the Divine Being, not by a participation of essence, but by a similarity of nature; that man excels all other animals in the faculty of reason; and that the existence of good men will be continued after death in a state in which they will receive the reward of virtue. Although it appears that on this latter topic he was not wholly free from uncertainty, the consolation which he professed to derive from this source in the immediate prospect of death, leaves little room to doubt that he entertained a real expectation of immortality; and there is reason to believe that he was the only philosopher of ancient Greece whose principles admitted of such an expectation. His moral system was in a high degree pure, and founded on the surest basis.—[*Platt's Universal Biography.*

LYCURGUS.

LYCURGUS, the celebrated legislator of Sparta, supposed to have been born about the year B. C. 926, was son of Eunices, king of that country, and brother to Polydectus. He might have succeeded to the throne himself on the death of Polydectus, but knowing that the deceased king's widow was pregnant, he publicly declared that he would now hold the crown in trust for the child, provided it should prove a son. The queen, ambitious of retaining her place and dignity, proposed to marry Lycurgus, and destroy the infant before its birth. Lycurgus took measures to prevent the completion of her wicked proposals; she was, in due time, delivered of a son, which being brought to him, as he was sitting at the tables with the magistrates, he took it in his arms, placed it in the chair of state, and exclaimed, 'Here, Spartans, is your king.' Lycurgus faithfully discharged the duty as regent and guardian during the minority of his nephew Charilaus; and as soon as the young prince came to years of maturity, he readily resigned all authority into his hands, left Sparta, and travelled into several foreign countries, with the view of obtaining a knowledge of their laws and customs. He first visited Crete, at that time governed by the laws of Minos. These laws he studied most carefully, and contracted a friendship with Thales, whom he persuaded to settle at Sparta. He thence passed over to Asia, making observations on the principal Ionian cities, which were overwhelmed in luxury and effeminacy. Here he met with the works of Homer, which he transcribed and brought into Greece. The confusion which followed his departure from Sparta, made his presence again necessary, and he returned home at the earnest solicitation of his countrymen. Perceiving that the disorders of the state admitted no other effectual remedy than a total change of the laws and constitution, he prepared to give a new legislative system to Sparta. He took care to fortify his authority with the sanctions of religion, and obtained from the oracle of Delphi a declaration, that the constitution he was about to establish would be the most excellent in the world.—His principal object, as a patriot, was to render his country great and respectable among surrounding nations; this he attained, and Sparta, under the laws of Lycurgus, became a nation of invincible warriors, who, for a series of years, bore the greatest sway in the affairs of Greece, and were the bulwark of their friends, and the dread of their foes.—Lycurgus has been compared to Solon, the legislator of Athens. The office of Lycurgus demanded resolution, and he showed himself inexorable and severe. The Lacedemonians showed their respect for this great legislator, by annually celebrating a festival to his honor, at which his praises were reiterated, and which was continued several ages. It is not agreed in what manner, or when he died; according to Plutarch, he voluntarily put an end to his life by abstinence, while he was yet of an age to enjoy it. Lucian says he died at the age of eighty-five. The laws of Lycurgus were abrogated by Philopœmen, in the year B. C. 188; but the Romans very soon re-established them.—[*Ibid.*

XERXES.

XERXES, the son of Darius I., by Atossa, the daughter of Cyrus, was born in this century, and on the death of his father, succeeded to the crown of Persia, in the year B. C. 485. Having in the second year of his reign subdued the revolted Egyptians, and committed them to the government of his brother Achæmenes, he determined to renew the invasion of Greece, in which Darius had been disappointed; and for the success of his expedition, he formed an alliance with the Carthaginians, on condition of their making an attack on the Greek colonies in Italy and Sicily, so that they might not have it in their power to assist their mother country.—His preparations were immense, and occupied several of the first years of his reign. Having provided a large navy, he formed a project of cutting a canal through Mount Athos, of sufficient breadth to admit two galleys abreast; and to this undertaking, which some have regarded as a fiction, he devoted three years. He also constructed a bridge of boats across the Hellespont, in order to convey his army from Asia to Europe, and as the first bridge which had been laid was demolished by a storm, he not only manifested his childish rage by ordering 300 lashes to be inflicted on the sea, and a pair of fetters to be thrown into it, but showed his tyrannical and cruel disposition, by beheading those to whom the conduct of the work had been committed. The number of sea and land forces which he employed in this expedition is said to have amounted to two millions and a half, to which we may add as many more attendants. When he ascended a high tower at Abydos, and took a view of the immense number that covered the sea and surrounding plain, his pride and triumph are said to have given way to tears, when the reflection occurred, that the brevity of human life was such as not to allow one of this countless host to survive the lapse of 100 years. Without detailing the events of this disastrous expedition, which are the proper subjects of history, we shall merely mention that it terminated in the defeat of Xerxes's navy at Salamis, and the subsequent overthrow and dispersion of Mardonius's army of 300,000 men. Upon his taking possession of Athens, he wreaked his vengeance on the buildings and the temples, and despatched a special messenger to his uncle Artabamus, to inform him of this inglorious triumph.—Having erected a throne on a lofty mountain, in order to view the expected victory at Salamis, the event produced such consternation, that he suddenly left Mardonius and the army, and hastened to the Hellespont, where finding his bridge shattered by storms, but still haunted with terror, he entrusted himself in a fishing-boat, and hastened to Sardis; but when Mardonius was defeated, and all his hopes of conquering Greece were frustrated, he quitted Sardis, after having given orders for the demolition of all the temples in the Greek cities of Asia, and proceeded with all possible expedition to the Persian frontier. The other traces of his disgraceful expedition were the records of the cruelties and debaucheries exercised by himself and his family. So much at length did Xerxes become the object of contempt and hatred, that a conspiracy was formed among his own guards, which terminated in his murder during sleep, in the twenty-first year after his accession, B. C. 465.—[*Ibid.*

ÆSOP.

ÆSOP, the Phrygian, lived about the fiftieth Olympiad, under the reign of Crœsus, the last king of Lydia. As to genius and abilities, he was greatly indebted to nature; but in other respects not so fortunate, being born a slave, and extremely deformed. St. Jerome, speaking of him, says he was unfortunate in his birth, condition in life, and death; hinting thereby at his deformity, servile state, and tragical end. His great genius, however, enabled him to support his misfortunes, and to alleviate the hardships of servitude. He composed those entertaining and instructive fables, which have acquired him much reputation. He is generally supposed to have been the inventor of that kind of writing; but this is contested by Quintilian, who seems to think that Hesiod was the first author of fables; and we are certain that Jotham, the son of Gideon, was the author of a fable, or parable, long before either of them. Æsop, however, certainly improved this art; and hence it is that he has been accounted the author of this sort of productions. The first master whom Æsop served was one Carusius Demarchus, of Athens; and there, in all probability, he acquired his purity in the Greek tongue. After him, he had several masters; and at length came under a philosopher, named Xanthus, who enfranchised him. When he had recovered his liberty, he soon acquired a great reputation amongst the Greeks; and the report of his wisdom having reached Crœsus, he sent and engaged him in his service. He travelled through Greece; and passing by Athens, soon after Pisistratus had usurped the sovereign power, and finding that the Athenians bore the yoke very impatiently, he told them the fable of the frogs who petitioned Jupiter for a king. The images made use of by Æsop are certainly happy inventions to instruct mankind; they possess all that is necessary to perfect a precept, having a mixture of the useful with the agreeable. Æsop was put to death at Delphi. Plutarch tells us that he came there with a great quantity of gold and silver, being ordered by Crœsus to offer a sacrifice to Apollo, and to give a considerable sum to each inhabitant; but a quarrel arising between him and the Delphians, he sent back the money to Crœsus; for he thought those for whom the prince designed it, had rendered themselves unworthy of it. The inhabitants of Delphi contrived an accusation of sacrilege against him, and pretending they had convicted him, threw him headlong from a rock. For this cruelty and injustice, we are told they were visited with famine and pestilence; and consulting the oracle, they received for answer, that the gods designed this as a punishment for their treatment of Æsop. They endeavored to make an atonement, by raising a pyramid to his honor.—[*Ibid.*

XANTHUS.

XANTHUS, a philosopher of Samos, called by others Tadmon, who purchased Æsop, the fabulist for his wit, and afterwards gave him his liberty.—[*Ibid.*

VOLCANOES.

AFRICAN ISLANDS.

The continent of Africa appears, as far as we are acquainted with it, to have been but little afflicted with volcanic visitations at any time. But its different groupes of islands exhibit strong and striking marks of this terrible scourge. These are chiefly to be traced in St. Helena, among the Cape Verd and Fortunate Islands, or Canarics, and in the Isle of Bourbon or Reunion.

St. Helena.—Besides the volcanoes which are still burning, there are innumerable mountains which bear evident marks of fire that is now extinct, and has been so from the time of the earliest traditions: among these is the isolated rock of St. Helena, where the inequalities of surface are manifestly the effect of the sinking of the earth; for the opposite ridges, though always separated by deep, and sometimes by broad valleys, are exactly similar, both in appearance and direction: and that the sinking of the earth in those parts was caused by subterraneous fires, is equally manifest from the stones; for some of them, especially those in the bottom of the valleys, are burnt almost to a cinder; in some there are small bubbles, like those that are seen in glass which has been urged almost to fusion; and some, though at first sight they do not appear to have been exposed to the action of great heat, have been found, upon a closer inspection, to contain small pieces of extraneous bodies, as, particularly, *mundick*, which have yielded to the power of fire, though it was not sufficient to alter the appearance of the stone which contained them.

Cape Verd Islands.—This group of islands affords several that have been long extinct. Among those that are occasionally active, the chief is to be found in the island of Fogo or Fuego. This is situated in latitude 15° 20′ north, is much higher than any of the rest, and appears at sea like one continued mountain. In sailing by it, no valleys are to be seen, these only resembling gutters, made by torrents of rain running down the mountain: but when a person is on shore, near one of these seeming gutters, he finds that they are deep valleys bounded by lofty mountains.

On the top is a volcano, which may be seen at a great distance at sea. It sometimes casts forth fragments of rock, of an amazing size, to a vast height, with a noise like that of the loudest thunder; and sometimes torrents of flaming brimstone pour from the peak, like the rushing of water down a steep mountain; after which the inhabitants can gather what quantities of that mineral substance they please. It is not unlike common brimstone, but is of a much brighter color, and being burnt, gives a clearer flame. At other times, the volcano casts forth such an amazing quantity of ashes, that the adjacent parts are covered, and many goats smothered.

Canary Islands.—The principal volcanoes belonging to this group of islands are to be met with in Lancerota, Fuertaventura, Palma, and Teneriffe.

In Lancerota and Fuertaventura are many hills that were formerly volcanoes, the tops of which are of a small circumference, and are hollow for a little way downward; the edges of the tops being usually narrow and sharp, and on the outside is generally seen a great deal of black dust, and burnt stone, like pumice-stone, only darker and more ponderous. No eruptions have been known to happen for several ages, except one at Lancerota, which, about sixty years ago, broke out on the south-west part of the island, throwing out such an immense quantity of ashes and huge stones, and with so dreadful a noise, that many of the inhabitants, leaving their houses, fled to Fuertaventura; but some time after, finding that those who ventured to stay had received no hurt, they took courage, and returned. This volcano was near the sea, in a place remote from any habitation. At a small distance from it, a pillar of smoke issued from the sea, and afterwards a small pyramidical rock arose, which still continues. This rock was joined to the island by the matter thrown out of the volcano. The noise of the eruption was so loud, that it was heard at Teneriffe, although at the distance of forty leagues, which was probably occasioned by the wind generally blowing from Lancerota toward that island.

Palma is a high and spacious mountain, steep on all sides. It is called *La Caldera, the Cauldron*, from a hollow like that on the Peak of Teneriffe. The summit is about two leagues in circumference, from which, on the inside, the Cauldron descends gradually to the bottom, which is a space of about thirty acres. On the declivity of the inside spring several rivulets, which, joining together at the bottom, issue in one stream through a passage to the outside of the mountain, from which this brook descends, and having run some distance, turns two sugar-mills. The water of this stream is unwholesome, on account of its mixing with other water of a pernicious quality in the Cauldron, all the inside of which abounds with herbage, and is covered with palms, pitch-pine, laurel, lignum-rhodium, and ratamas, which last have in this island a yellow bark, and grow to the size of large trees, but in the others they are only shrubs. The people here take great care not to let the hegoats feed on the leaves of the ratama, as they imagine those leaves breed a stone in the bladder, which kills the animal.—[*Gallery of Nature and Art.*

PORCELAIN MANUFACTORY.

I visited some potteries in Worcester, where most beautiful porcelain is made, almost rivalling, in the pure white delicate texture of the materials, as well as in the richness of the painting, the porcelain of France. Having been conducted with much civility through the various departments of the works, from the pulverization of the feldspar and the kneading of the clay, to the packing of the finished ware, all of the several processes were explained successively to me.

Porcelain vases and utensils, of the most delicate proportions, are first rudely formed upon an ordinary potter's wheel, like common earthen ware, and are then dried. These roughly fashioned vessels of dried clay are then put into a turning lathe, and pared down to the desired form by means of a chisel, as in the process of turning wooden bowls. This plan is pursued in making tea cups and saucers, plates and all the sorts of ware of a circular form; but for impressing upon the plastic clay square, oval and other irregular forms with raised borders or figures, moulds are employed, into which the clay is forcibly thrust. After the labor of turning or moulding the clay is completed, the fragile newly formed vessels are carefully placed in the kiln, where they are exposed to the action of the fire until they become partially baked and hardened. In this state the pieces are called biscuit. The degrees of heat in these kilns are accurately determined by a Pyrometer, an instrument invented by Wedgewood, the great author of the improvements in this branch of manufacture in England. The principle upon which these Pyrometers are found to designate extreme degrees of heat, which would melt the glass of common thermometers, is the well known contractibility of clay; this material shrinking in bulk quite regularly, by exposure to intense heat. The contraction of the pieces of clay prepared for this purpose, after being exposed to great heat, is ascertained by slipping them between two straight pieces of brass fixed upon a plate, having two of the ends nearer to each other than the opposite extremities. In proportion as the heat becomes more intense, the contraction of the clay becomes more evident from their sliding further in between the converging sides of the brass gauge, which is marked with the suitable scale of degrees to indicate the heat to which the clay has been exposed.

After the ware has been partially baked, it becomes sonorous, and is in a proper state to receive the application of the paint brush. The operation of painting is a work requiring great skill and nicety. Many female artists are here seated at the tables, applying with their brushes various mineral preparations to produce the desired colors. These mineral compounds have not, when originally applied, the tints of color which they finally assume after being exposed to the action of fire. The colors are materially changed during the burning, as the color of common bricks is altered by the fire to a bright red, These compounds, to produce the colors, it may well be supposed, must be such as both to acquire the desired shade by the application of heat, and also to resist its intense action in the kilns, where the ware is a second time exposed to be semi-vitrified on its surface, or glazed. In this process, great care is required to regulate the heat by the Pyrometer; otherwise the whole mass of ware may become partially melted or destroyed. As you stand by the side of the persons engaged in painting landscapes and figures on the porcelain biscuit, you can see no picture or shade that, in the varied hues and blended colors, resembles the same patterns or designs after being withdrawn from the kiln. The porcelain painter must not only possess the ordinary skill of a limner, but must also have a knowledge of the effect of fire on his colours; which he applies, with a prescience of what they will become, without reference to the present shades which they produce. A sort of gray compound finally produces a yellow or orange, and a brown mixture yields at last a deep violet and purple. Cobalt, which produces a beautiful blue, is a costly metallic oxide the price being here six or eight dollars a pound. The oxides of gold, silver, antimony, copper, and iron, are all severally employed. The gold for gilding the ware is applied in the pulverised state, having a dark earthy appearance until the heat revives the metallic lustre. The fire has apparently a magical effect, causing the brightest colours to appear where the most faded daubs of incongruous colors are applied.

The finest paintings are here executed by females, some of whom, it was stated to me receive very considerable prices for the exertion of their skill and taste.

The mode of printing the irregular unyielding surfaces of earthern ware is both simple and ingenious. The landscapes and other patterns of various sorts are first engraved upon copper plates, in the usual way; but an adhesive viscid fluid is used instead of the ink. This gummy substance is rubbed into the channels or lines furrowed by the graving tool in the copper plate, the smooth surface of which is then wiped dry. When paper is applied to the surface of the plate, and both are passed between rollers, to make the contact as perfect as possible, the spongy texture of the paper sinks into the lines of the copper, and absorbs from these cavities all the glutinous fluid, which remains in them, after the plain polished surface of the copper plate has been wiped clean. The paper, thus impressed with a glutinous substance, is applied by the palm of the hand to the rounded or concave sides of the ware, to which, from its pliability, it readily adapts itself, as to a plain flat surface. The lines of this glutinous substance are absorbed from the paper by the dry baked clay. In this state, the ware is prepared to receive coloring substances, which are first reduced to a dry powder, and are then sprinkled or sifted over the ware. Wherever the glutinous matter has been applied upon the sides of the baked clay, these light impalpable powders will adhere, and when subsequently exposed to the heat of the furnace, they will penetrate into the pores of the wares, wherein it is covered with the vitrified glazing. For common blue printed ware the workmen use the cobalt, ground and prepared like common printer's ink, and it is applied like that ink immediately to the engraved copper plate, instead of the glutinous substance above mentioned. A fair impression of the cobalt ink is struck off upon thin paper. Whilst freshly covered with the undried lines of the ink, this paper is applied to the dry ware, which readily imbibes it, after which the paper is rubbed off, leaving the picture distinct upon the surface of the ware. Thus are multiplied expeditiously, the sketches or designs, which before the invention of this process required much expense, and labored skill of the pencil.*

* The manufacture of porcelain has been commenced in the United States, where the texture of the wares produced have been almost unrivalled for compactness, and for a pearl-like delicacy, the materials being found in abundance in the United States of the best quality. Skilful artists are yet wanting to embellish, by tasteful designs, the beautiful vases and utensils which are readily produced by the laborers employed.—*Practical Tourist.*

THERMOMETER,

An instrument for measuring heat, founded on the principle, that the expansions of matter are proportional to the augmentations of temperature. A common thermometer, therefore, is merely a vessel in which very minute expansions of mercury may be rendered perceptible; and, by certain rules of graduation, be compared with expansions made on the same liquid, by other observers.

Air is the most expansible fluid, but it does not receive nor part with its heat so quickly as mercury. Alcohol does not expand much by heat. In its ordinary state it does not bear a much greater heat than 175° of Fahrenheit; but when highly rectified it can bear a greater degree of cold than any other liquor hitherto employed as a measure of temperature. At Hudson's Bay, Mr. Macnab, by a mixture of vitriolic acid and snow, made it to descend to 69° below 0 of Fahrenheit. There is an inconvenience, however, attending the use of this liquor; it is not possible to get it always of the same degree of strength. As to oil, its expansion is about 15 times greater than that of alcohol; it sustains a heat of 600°, and its freezing point is so low that it has not been determined; but its viscosity renders it useless.

Mercury is far superior to alcohol and oil, and is much more manageable than air.—1. As far as the experiments already made can determine, it is of all the fluids hitherto employed in the construction of thermometers, that which measures most exactly equal differences of heat by equal differences of its bulk: its dilatations are, in fact, very nearly proportional to the augmentations of heat applied to it. 2. Of all liquids it is the most easily freed from air. 3. It is fitted to measure high degrees of heat and cold. It sustains a heat of 600° of Fahrenheit's scale, and does not congeal till it falls 39 or 40 degrees below 0. 4. It is the most sensible of any fluid to heat and cold, even air not excepted. Count Rumford found, that mercury was heated from the freezing to the boiling point in 58 seconds, while water took 2 minutes 13 seconds, and common air 10 minutes and 17 seconds. 5. Mercury is a homogeneous fluid, and every portion of it is equally dilated or contracted by equal variations of heat. Any one thermometer, made of pure mercury, is *cæteris paribus*, possessed of the same properties with every other thermometer made of pure mercury. Its power of expansion is indeed about six times less than that of spirit of wine, but it is great enough to answer most of the purposes for which a thermometer is wanted. The fixed points, which are now universally chosen for adjusting thermometers to a scale, and to one another, are the boiling and freezing water points. In order to ensure uniformity, therefore, in the construction of thermometers, it is now agreed, that the bulb of the tube be plunged in the water when it boils violently, the barometer standing at 30 English inches, and the temperature of the atmosphere 55 degrees.—[*Mitchell's Encyclopædia.*

BAROMETER,

A philosophical instrument for measuring the weight of the atmosphere. The barometer may be said to be the invention of Torricelli, who, observing that a column of water of about 33 feet was equal in weight to one of air of the same base, concluded that a column of mercury of only 29 1-2 inches would be so too, such a column of mercury being equal in weight to 33 feet of water.

The common barometer is a glass tube about two-tenths of an inch in diameter, and its length at least thirty-one inches.—This tube is filled with mercury so as not to have any air over it, the maker placing his finger on the end, immerses it in a bason of quicksilver, and then takes his finger away. The quicksilver in the tube by its own weight endeavors to descend into the bason: but the external air pressing on the surface of the quicksilver in the bason without, and no air being in the tube at top, the quicksilver will continue in the tube, being raised by air on the surface in the bason below. The usual range of the barometer in this country is from twenty-eight to thirty-one inches; when the air is pure and heavy, it raises the mercury to nearly thirty-one, and when light and full of vapors, it falls to nearly twenty-eight. In fine, *dry* weather the air is rendered pure, free from all light vapors, and is consequently extremely heavy, so that it presses up the quicksilver. In most rainy weather the atmosphere being charged with vapors, clouds, and fogs, the air is then sensibly lighter, and presses upon the quicksilver with less force. When high winds blow, the atmosphere is light, and the quicksilver generally is low, and it rises higher in cold weather than in warm. During frost, the air is purest and heaviest, and the barometer rises to its highest points. This instrument is also serviceable in measuring the height of mountains. In ascending mountains, quicksilver is found to sink about a tenth of an inch in ninety feet; so that if the quicksilver fall an inch, we have ascended near nine hundred feet; but this is subject to variations, from change of temperature and other causes, which render various corrections necessary. The general method, however, of determining altitudes by the barometer and thermometer is extremely useful and convenient; and ingenious rules are given by Dr. Hutton, Dr. Gregory, Sir Henry Englefield, and others to facilitate the computation.—[*Ibid.*

PYROMETER.

The most celebrated instrument for measuring high temperatures is that invented by the late Mr. Wedgewood, founded on the principle, that clay progressively contracts in its dimensions, as it is progressively exposed to higher degrees of heat. He formed his white porcelain clay into small cylindrical pieces, in a mould, which when they were baked in a dull red heat, just fitted into the opening of two brass bars, fixed to a brass plate, so as to form a tapering space between them. This space is graduated; and the farther the pyrometic clay gauge can enter, the greater heat does it indicate. The two converging rules are placed at a distance of 0.5 of an inch at the commencement of the scale, and of 0.3 at h e end.—[*Ibid.*

Hydrometer.

The names *aereometer, hydrometer, gravimeter*, have been indiscriminately applied to those instruments which are employed for determining the specific gravities of spirituous liquors and other fluids.

The best method of weighing equal quantities of corrosive volatile fluids, to determine their specific gravities, appears to consist in enclosing them in a bottle with a conical stopper, in the side of which stopper a fine mark is cut with a file. The fluid being poured into the bottle, it is easy to put in the stopper, because the redundant fluid escapes through the notch, or mark, and may be carefully wiped off. Equal bulks of water, and other fluids, are by this means weighed to a greater degree of accuracy, care being taken to keep the temperature as equal as possible, by avoiding any contact of the bottle with the hand or otherwise. The bottle itself shews with much precision, by a rise or fall of the liquid in the notch of the stopper, whether any such change have taken place.

The hydrometer of Fahrenheit consists of a hollow ball, with a counterpoise below, and a very slender stem above, terminating in a small dish. The middle, or half length of the stem, is distinguished by a fine line across. In this instrument every division of the stem is rejected, and it is immersed in all experiments to the middle of the stem, by placing proper weights in the little dish above. Then, as the part immersed is constantly of the same magnitude, and the whole weight of the hydrometer is known, this last weight added to the weights in the dish, will be equal to the weight of fluid displaced by the instrument, as all writers on hydrostatics prove. And accordingly, the sp. gravities for the common form of the tables will be had by the proportion:

As the whole weight of the hydrometer and its load, when adjusted in distilled water,
Is to the number 1000, &c.
So in the whole weight when adjusted in any other fluid,
To the number expressing its specific gravity.

There are various kinds of hydrometers in use, but that of Sikes appears to be the most generally approved, since it is universally used in the collection of the revenue in both kingdoms.—[*Ibid.*

ABUSES.

Moral Faculties.

What are our moral powers? For what were they made, and how are they used?—Is not moral power the power to do right or wrong, according to the choice of an individual? Is it not that power which, more than any thing or every thing else, distinguishes the man from the brute? The brute has some intellect, and some feeling or affection, in many instances very strong affections. Many of the inferior animals not only have the external senses more exquisite than men; they cannot only see, hear, taste, smell, and feel with more nice perceptions than any of the human race, but their memories are stronger, they have fear, anger, love, hatred, ambition, or love of power, and are capable of much improvement. But a moral sense, a perception of right and wrong, they have not. As they have not the power of distinguishing between right and wrong, they have no power to pursue the one, or avoid the other.

Moral perception is distinct from moral power. A person may perceive the right, and do the wrong; but though moral perception may exist without moral power, moral power cannot exist without moral perception. Whatever a person may do without perceiving it to be right or wrong, has no moral character. It deserves neither praise nor blame; it is neither moral nor immoral. An involuntary act, whether it arise from an amiable or unamiable disposition, deserves neither praise nor censure. A disposition naturally amiable, kind, affectionate, is indeed beautiful; so is a rose beautiful, but it is not moral nor immoral.

It is neither moral nor immoral for a mother to love her child, but it is immoral for a mother not to love or to neglect her child.—If natural affection implies moral character, then the cow, the sheep, the swine, the tiger, and the lion, are moral—for they have natural or parental affection, and frequently in a great degree.

Though the exercise of natural affection implies no praise, the violation of that affection, in a rational being, implies blame.—It implies blame, because our reason, acting in the form of moral perception, teaches us it is wrong.

Moral sense, or the faculty by which we distinguish between right and wrong, is not only possessed by the human race, but it shows itself at an early age. Children of three years old frequently have it; and at five or six years of age, they possess it, or may possess it in an eminent degree. Like all other faculties, it is capable of rapid and indefinite cultivation. The moral perceptions may constantly become more nice and infallible, and the moral power stronger by proper cultivation and proper use. But by the abuse of this faculty, the moral perception may become blunt or obtuse, and the moral power weak, or entirely destroyed and obliterated.

Such is unfortunately the fact. We abuse every thing, but ourselves most. We abuse all our faculties. Our physical nature is weakened or destroyed by abuse. We bring upon ourselves sickness, disease, and death. Our intellectual nature is also warped, blunted, and sometimes destroyed, by abuse. Our social faculties, also, so prominent and so beautiful as a part of our nature, by abuse, are sometimes exercised in a fiendlike spirit.

But our moral faculties, which are the highest, noblest gift of heaven, are also most abused; and, by abuse, they scatter thick around us misery, ruin, and death. If our moral faculties suffer, all our other faculties must suffer with them. Moral existence is not only the glory of the universe, but it is the regulator of the universe.—The intellect directs the hand, but the moral being directs the intellect. If that is perverted, the intellect must be misapplied, and the hand misdirected. If the moral being is blunted, it is followed by an obtuseness of intellect. If the moral perceptions are quick, and moral power active and strong, the intellect is awake and active, and directs the physical powers to proper measures to secure a worthy object. But under a perverted moral sense, the choice of objects must be wrong, but the intellect may still do its appropriate work, so far as to adopt measures to secure those objects. The intellect of the midnight assassin directs his hand to the proper measures for accomplishing his nefarious deed, no less than the intellect of some administering angel directs him in his works of love to the poor and distressed.

As the moral creation is the glory of the universe, and that for which every thing else was created, when that abuse defeats the object for which it was designed, it spreads desolation, ruin, and gloom over the otherwise resplendent and happy dominions of the Creator. Then, those affections designed for love, are changed into hatred; kindness is changed into ill-will; the natural desire of excelling degenerates into envy, ambition, or malice. Those intellects designed to fit means to ends in works of benevolence, waste and pervert their strength in every evil work. Those hands so admirably fitted for acts of kindness and mutual goodwill, rise up against each other for their mutual injury or ruin. Those feet designed to conduct men to heaven, take the road to hell.

POLITICAL ECONOMY.

Poverty.

In our last, we merely referred to the principle in political economy, advanced by Malthus, and recognized by Chalmers, and some others, that the cause of poverty, or want, is an over population; or, that there are too many mouths and backs for the hands.

It is not our intention now to present a full exposition of that principle, much less to go into the general subject of pauperism or want; of the necessaries for our physical, intellectual, social, and moral natures. We merely wish to advance two facts, as proofs of the unsoundness and the fallacy of the principle referred to. The first fact is, that in the infinite wisdom and overflowing goodness of our Creator, human beings are endowed with powers and surrounded with materials more than sufficient to supply their physical wants in the rudest state of society, or under the most imperfect state of the arts. Though no one will probably deny or doubt this general fact, in proof of the very great surplus of time after the physical wants are supplied, the many thousands and millions of years and lives which have been spent in war, or Egyptian pyramids and similar objects, may be mentioned. History furnishes facts without number, to prove, that in all stages of society and all ages of the world, after the necessary wants of society are supplied, a very great amount of time remains on hand, to be appropriated to other objects.

If such is the fact without the aid of machinery or science, and under the most imperfect state of the arts, it surely must be so when the power of the elements, heat, air, and water, is applied under the guidance of science to improved machines, to produce food and clothing. If it is true that much more cotton cloth can be made by hand wheels and looms, by which a person can spin two runs and weave eight yards in a day, than is necessary to supply the wants of society, it surely must be true when the same person can spin fifty runs or weave a hundred yards in the same time.

The fact here advanced is so glaring, and is so fully proved by almost every thing on which we can fix our eyes, as to render argument in the case unnecessary.

The second fact we wish to advance in proof of the unsoundness of the principle in question, is, that where the population is great, there is actually a greater abundance of the necessaries of life produced in proportion to the population, than where it is small: more yards of cloth, and a greater variety; more bushels of grain, potatoes, &c.; besides the great amount of time expended on unnecessary articles, such as expensive houses and furniture, expensive clothes of wool, cotton, linen, and silk: In other words, though it may appear like a paradox, the greater the abundance the greater the poverty.

If these two facts are admitted, and we believe that few will deny them, at least that they can be substantiated by a host of evidence, it must follow that poverty is not the necessary result of a dense population.—And that no country has yet become so populous, unless it may possibly be China, as to render poverty necessary.

It is not our design at this time to show what is the cause of poverty, but to show what is not; and that it is not what is stated to be by some modern political economists.

APPARATUS

for Lyceums, Schools, and Families.

The Lyceum Apparatus, furnished by Messrs. Allen & Ticknor, and by Messrs. Carter, Hendee & Co., Boston, consists of Instruments for Astronomy, Natural Philosophy, and Chemistry, and is afforded at about sixty dollars.

The School Apparatus embraces Geography, Arithmetic, Geometry, and Astronomy. Price, $10 a set.

The Family Apparatus is for teaching the Alphabet, Numbers or Simple Arithmetic, and Figures or Geometry, and Geography. Price $5.

When a Town Lyceum, each town and school, and all the families, are furnished with their appropriate sets, they aid each other in the great and good work, and together furnish amusement and instruction for a whole community. This is Political and Domestic Economy.

Family Education.

It is truly gratifying to witness the extensive and increasing interest on the subject of Family Instruction. We have proofs of this interest, both in public journals, by very numerous correspondents, and by the great demand for Family Apparatus. We are animated with the hope, that the time is near when every family in the Union will constitute a school, and when every child's employment will be to amuse and improve himself by a set of '*Intellectual Toys*,' and not works of mischief, which he chooses for himself because his parents choose none for him.

Family Apparatus.

A teacher from Georgia, whose pupils are furnished with the Family Apparatus at home, says that they pursue their studies at school with much greater interest and success, since they have had it.

A parent from South Carolina, says that his children manifest a much deeper interest in their school, since they have had a set of the Family Apparatus.

Another parent says that the Family Apparatus has more than paid for itself by the mischief it has prevented in his children, and that it has paid for itself several times over by the amusement and instruction it has afforded to the children of a larger as well as of a smaller growth.

Geography for Children.

A little girl, about three years old, on returning from school a few days since, was told by her mother that her father had gone to New Bedford. The daughter replied, 'Where is the map, mother, I want to see where New-Bedford is.'

This is one instance among thousands which might be given, to show that Geography can be understood and applied by the minds of children at an early age. Probably no subject throws open at once so large a field for the mind to range in, and no field presents so great or so rich a variety to gratify and enlarge the mind.

Children can get many ideas in Geography, which they can understand and apply, long before they can count ten understandingly, and before they can learn the alphabet—at least, with much greater ease and pleasure than they can learn the twenty-six unmeaning characters used in our language.

Liberia.

The colony at Liberia may with great ease be made a stepping-stone to the civilization of the whole of Africa. If the representatives of the numerous tribes in the interior, who visit the colony for purposes of instruction, or even for business, could become acquainted with the mode of acting on minds by the means of visible objects, or by appropriate apparatus, and then return with a supply of necessary instruments, and become itinerary teachers, the whole continent might in a short time become enlightened, civilized, and christianized.

Western Indians.

If a few itinerary teachers, who understand the language of the Western Indians, could be employed to travel among them, and give instruction in all their towns and settlements, by the means of visible illustrations, by which the mind can be interested and enlightened at the same time, not only the sciences, but the arts of civilization, might in one generation be introduced into every tribe and every settlement.

Winter Schools.

If each child, at the opening of his winter school, should contribute 20 or 30 cents for Apparatus, the twenty thousand schools in New-England and New-York might all be supplied with sets; and each child be benefitted by the enlargement of his heart as well as mind.

If all the teachers in each county should hold a convention to consult upon schools, and to witness an exhibition of Apparatus and other improvements, the value of their instruction during the winter season must be at least doubled.

Metals.

Metals are distinguished by their peculiar lustre, called the metallic lustre: they are opaque, except gold, even in the thinnest plates to which they can be reduced. All the old metals are heavier than water; but some of the new metals discovered by Sir H. Davy are lighter than water. They are the best conductors of electricity known; they are all soft, although some of them have a capacity for great hardness, which may be artificially produced, as may also their elasticity. Some of them are *malleable*, while others are extremely *brittle*; some are *ductile*, and may be drawn into very fine wires; others are destitute of this property. Several of them take fire when heated, and burn with great splendor; and almost all of them may be burnt by peculiar contrivances.

Gold.—Gold is always found in nature in a metallic state. It is generally met with in grains, called gold dust, mixed with the sand of rivers; being carried away by them from the rocks and mountains, where it is found in leaves or ramifications, adhering to quartz and other stones.

It is of a rich yellow color; and is the heaviest of metals, except platina. It is not very hard when pure. It is the most ductile of all the metals. It cannot be oxidated by any heat of a furnace, but may by electricity and galvanism.

Gold is not acted upon by any acid, except the oxigenated muriatic, or nitro-muriatic acids, which latter was called from this aqua regia, because gold was named by the alchymists the king of the metals. With silver it forms an alloy of considerable ductility. Copper heightens its color, and renders it harder. Tin and lead considerably impair its tenacity. With platina it forms an alloy which is very ductile. With zinc it affords a brittle and hard mixture, susceptible of polish. It unites well with iron, and hardens it remarkably.

On account of its peculiar property of not tarnishing in the air, it is much used for defending other metals; and on account of its beautiful lustre, it is much employed in ornaments. Its specific gravity is 19.3.

Zinc is of a brilliant white color, with a shade of blue, and is composed of thin plates cohering together. It is somewhat harder than silver. Its specific gravity when hammered is 7.1908. Zinc was formerly supposed not to be ductile: but if heated to a little above 212°, it becomes very malleable, and may be drawn into wires. Combined with copper, zinc forms one of the most useful alloys, namely brass.

FERMENTATION.

[Concluded from the last Lyceum.]

PUTREFACTIVE FERMENTATION.

Thus we find that putrefaction does not take place at a low temperature; and it seems that the agency of cold is equivalent to the preservation effected by the expulsion of all the moisture present in the animal matter. To render moisture solid is precisely the same as to withdraw the moisture altogether. We know that putrefaction is also prevented by an elevated temperature. For any thing known to the contrary, flesh would be prevented from putrefaction as long as it could be kept at a boiling temperature. Herculaneum was destroyed A. D. 79, by an eruption of Vesuvius, and in a short time buried beneath the shower of hot ashes thrown up from the volcano. The high temperature, no doubt, evaporated the moisture from the bodies and thus preserved them; for many were found preserved. 'Within the houses they found dead bodies, medals, furniture, and things of all kinds. I was told that the bodies mouldered away when exposed to the air.' This mouldering on exposure to air is a common occurrence to bodies preserved out of contact with the atmosphere.

When once the temperature has been elevated sufficiently to produce putrefaction, the chemical action which ensues developes a sufficiency of heat to continue the process; and if the quantity of matter be great, the elevation of temperature may become considerable. Roses have a remarkable tendency to spontaneous heating; even a very moderate heap of them, not occupying more than the bulk of two cubic feet, if left together for a few hours, will heat in the centre, so as to raise the thermometer to 100 degrees, and sometimes even to 120. A large quantity of hay, if stored while damp, often heats to such an extent as to take fire; and great mischief is sometimes thus occasioned. I say nothing of the spontaneous combustions which happen when heaps of charcoal or common coal have got wet, as this depends on a different cause.

The septic tendency of animal matter is counteracted in a variety of other ways: as by the action of charcoal, of common salt, nitre, and other salts; by acids, as the acetic, the sulphuric, the muriatic; by tarry, bituminous, and resinous aromatics; by various spices; by alcohol, and even by sugar. According to Statius, the body of Alexander the Great was preserved in honey. And we find the following account recorded by Abdollatiph, the Arabian traveller;—'A person worthy of credit told me, that during a search for treasure near the pyramids, an oblong close vessel was found. This being opened appeared full of honey, whereof the party present ate; but some of them soon observing hairs sticking to their fingers, on further examination discovered that a young child with a certain jewel or ornament on its body, was enclosed.'

In the putrefaction of vegetable matter, the only element which remains is carbon, mixed with any earths and metallic oxides which the vegetable contained. This carbon, if the atmosphere be freely admitted, slowly combines with oxigen, forms carbonic acid, and at length the whole disappears. But if air be excluded, the carbon remains for ages unchanged. At the Giant's Causeway, in the north of Ireland, we find a coal lying over a rank of columns of basalt, with another rank of basaltic columns standing over it. This coal, which has a bituminous fracture, and burns with a white flame, is clearly the carbon of some ancient vegetable structure. We can plainly discover in it the grain of the wood, and the knots; and these latter are sometimes perfectly sound and unchanged either in texture or the natural color of wood, although taken from the centre of a block of coal. I have one of these in which the knot of sound wood grows darker and darker from the centre, until at length it blackens into the nature of the coal from which it was taken. This coal is not pure carbon, but contains also hydrogen. Nothing is more common in bogs than to find trunks of trees not only undecayed but even of a stronger texture than when growing. The bogs themselves may be looked upon as the carbonaceous remains of ancient vegetables, which, being buried and immersed in water, have not had access of air to combine with oxigen. Such accumulations of carbonaceous matter are not only in themselves of a most unchangeable nature, but impart their qualities even to animal substances enveloped in them. The discovery of dead bodies buried at considerable depths in bogs, and in a high state of preservation, proves the age of the bodies as well as the antiseptic quality of the bog. Such discoveries have been frequently made in Ireland. The following has been recently published by Mr. Petrie:—'In the Summer of 1821 the body of a man was found in a bog in the county of Galway. The bog was about ten feet and a half in depth and the body lay about nine feet below its surface. It had all the appearance of recent death when discovered, excepting that the abdomen was quite collapsed: but on exposure to the atmosphere it decayed rapidly. The face was that of a young man of handsome features and foreign aspect; and his hair, which was long and black, hung loosely over his shoulders. The head, legs, and feet, were without covering; but the body was clothed in a tight dress, covering also the limbs as far as the knees and elbows. This dress was composed of the skin of some animal, laced in front, and having the hairy side inwards.' This body must have been of great antiquity.

The following is from an early volume of the Philosophical Transactions:—'Jan. 14, 1764, during a great snow in Derbyshire, a man and woman were lost; and being found in May following, were buried in a peat moss, where they lay twenty-nine years. They were again found and appeared no way altered; the color of their skin being fair and natural, and their flesh soft as that of persons newly dead. They were occasionally exhibited during twenty years after; the man still remained perfect, the woman a little less so. They were then buried in a churchyard grave, where they speedily decayed.' There are many other instances on record but the following may suffice:—'In 1747, a man digging a peat-moor in Lincolnshire, found the remains of a woman about six feet below the surface, in a high state of preservation. From parts of her dress she appeared to be of the better order of society. The body was doubled up in the bog. The skin was soft and pliable, stretching like a piece of doe leather, and was as strong: it was of a tawny color. The nails of the hand were as fresh as in life. Bones, skin, gristle, nails and hair, were the substances which appeared best preserved. These remains were deemed very ancient.'

It seems very probable that the carbonaceous matter of bogs possesses an antiseptic quality in consequence of some modification which it and the other elements have undergone during gradual changes. It is certain that it is a common practice amongst the inhabitants of bog districts to tan horse hides by merely immersing them in a lough of bog water, and the process succeeds tolerably. That such water contains something actually dissolved from the turf is plain, from the fact that its color is brown, just as if tannin, or something of an approximate composition, had been dissolved in it.

In the putrefaction of vegetable matter, the changes which take place are more simple than those which occur in the case of animal substances. Lavoisier represents the nature of the change as follows:—'The constituent elements of the bodies cease to continue in equilibrium, and form themselves into compounds which consist of two elements only; the whole of the hydrogen is dissipated in the form of gas, and the oxigen and carbon escape in the form of carbonic acid; so that when the whole process is finished, especially if there had been a sufficiency of water present, nothing remains but the earth of the vegetable mixed with a small portion of charcoal and iron. Thus putrefaction is merely an analysis of vegetable substance, during which the whole of the constituent elements is disengaged in the form of gas except the earth, which remains in the state of mould.' But the changes which take place during the putrefaction of vegetable matter appear to be more complicated than this, under certain circumstances. When the putrefaction takes place in the open air, the decomposition is found to happen in the manner described by Lavoisier; but when the air is excluded, as when the decomposition takes place under water, the products are certainly different; for then we obtain carburetted hydrogen, as well as carbonic acid.

What remains, when the decomposition has totally broken down the structure of the vegetable, is a black pulverulent substance, consisting of much carbonaceous matter, combined, no doubt, with some hydrogen, a little earthy matter, and traces of metallic oxids. This constitutes what is called vegetable *mould*, and is also the chief ingredient in vegetable manure. It is the substance into which all vegetable structures are at length, although but slowly, resolved previously to its regeneration into the vital state when assimilated into the composition of some living plant.

The changes produced in animal matter by putrefaction are more complex, and more rapidly effected, provided that there is access of air. If there be no access of air, the change is much more slow. It has been ascertained, that where so many as a thousand or more dead human bodies were collected together, and the air was excluded by their lying over each other, it required thirty years to destroy their organic structure completely.

When the contact of air is prevented during putrefaction of animal matter, as in the case just alluded to, or where the animal matter has been for a long time immersed in water, a remarkable change is produced. The flesh is converted into a substance intermediate between wax and lard, and hence called *adipocire*. This substance is, in fact, a soap, in which the alkali present is ammonia, and the fatty portion is the altered animal matter. The manner of its production is quite obvious. Muscular flesh is composed of oxigen, hydrogen, and nitrogen. During its spontaneous decomposition, it is easy to conceive that some of the hydrogen may saturate itself with nitrogen, and form ammonia; while the remainder of the hydrogen may remain combined with carbon and a little oxigen, in such proportions as to form an oil or fat. This, by combination with the ammonia, would form a peculiar kind of ammoniacal soap; and such seems to be the nature of adipocire.

A few months' exposure of muscle to the action of a running stream of water is sufficient to effect this singular change; but many years are required to produce it when the animal matter is merely secluded from air by being buried in the ground.

DIFFERENT KINDS OF BREAD.

London Bread.—The method most followed to make the fermented bread is as follows: They dissolve in 36 lbs. of warm water, from 4 to 6 lbs. of salt, at the temperature of 84° of Fah., and then add three pints of yeast: on the other hand, they make a hole in the midst of a heap of 280 pounds of sifted flour; and with the solution of salt, and sufficient yeast for the flour, they make a paste sufficiently thick, and which they term a quarter sponge; they then again cover it with more flour, and close the kneading-trough with a piece of flannel. Three hours afterwards, they add 360 lbs. of boiling water to it, and knead up the mass with a new quantity of flour; this they term half sponge; five hours afterwards, they again add 108 lbs. of hot water, and work it with the remainder of the flour, for an hour at least; they then cut it into bits, again cover it with flour, and leave it at rest in a corner of the trough. Four hours afterwards, they knead it half an hour, and then form it into loaves, which they afterwards place in the oven.—They judge when the oven is sufficiently hot, by throwing a pinch of flour into it, and which ought to become black instantly, but without taking fire; they place the loaves so near to each other in the oven, that when they rise, they press each other, and take the form of cubes. They leave them two hours and a half in the oven, and when they withdraw them, they take care to cover them, to prevent them as much as possible from losing their weight. This loss, from the baking, amounts to a ninth part of the total weight, and yet the loaves nevertheless become three times as large as when put into the oven.—In London, they put half a pound of alum instead of the same quantity of salt, into the bread, as a seasoning. In the poorer parts of the country, they use equal parts of salt and alum.

Household Bread.—There are but few bakers who make this bread; it is ordinarily made in those families who bake their own bread. As the brown farina retains a much greater quantity of water than flour does, so this bread remains fresh for a longer time than the white bread, but is apt to crumble. As it is not generally well-kneaded, so it has a particular taste, which, although a little sour, yet it pleases many palates. It has likewise all the imperfections of being the first baking in an oven which has become cold; and therefore they prefer to use sheet-iron ovens, and to substitute cast-iron or sheet-iron in place of the vault of bricks; and which iron ovens also serve to bake other alimentary articles. Holmes's oven is of this kind, and derives its heat from a mass of cast-iron which projects from its side into the fire-place, and thus no flues are required.

Sea Biscuits.—To make the best biscuits, or the *American Crackers*, they take a good thin paste, and roll and double it many times, as if for puff-paste. The common sea-biscuits differ from the preceding, in not being made with so many doublings. They make a thick paste without leaven or salt, and in proportion as it extends beyond the feet, with which they knead it, they cut off the borders and throw them into the middle, and knead them anew. They thus obtain a biscuit which breaks in plates. These are baked in a very low oven, which resembles a muffle.

Spiced Bread.—(Gingerbread.)—To make this, they dissolve half an ounce of potash, and a little alum, in hot water; they then melt in it an ounce of butter, and knead it up with quick strokes, together with three quarters of a pound of treacle, and an ounce of mixed spices, of which the composition is variable: but for the most part consists of ginger, canella, nutmegs, and the four spices. Carawayseeds, aniseseeds, raisins of Corinth, almonds, and other confectionary articles, are also sometimes added. We may also omit the alum, and replace the potash, by the carbonate of magnesia, which, by the strength of a small quantity of it, enables us to compound it as follows:—viz., 2 lbs. of flour, half an ounce of magnesia, 1 lb. and a half of treacle, 2 ounces of butter, and the necessary quantity of water to knead it, holding in solution a quarter of an ounce of tartaric acid, form a paste which will rise in half an hour. In France the spiced bread is made with honey and rye meal, without any butter or water.

French Bread.—The bakers in France commence their operations at five o'clock in the morning, by mixing 5 pints of water, and 3 lbs. of leaven, reserved from the last baking, and as much flour as will make a paste, weighing 17 lbs. Ten hours afterwards they add 10 or 11 pints more water, and sufficient flour to make a paste of 40 lbs. weight; two hours afterwards, 24 pints more water, and flour enough to make a paste of the weight of 120 lbs. From this paste they cut off a portion of three pounds in weight, to serve for the leaven of the next day's baking. Then, four hours afterwards, they make a new addition of 100 lbs. of flour, and from 70 to 80 pints of water, and which will yield a mass of about 300 lbs. weight. They then begin to beat the paste, and when it is well-kneaded, they separate about 80 lbs. of it, which is to serve as the leaven for the next baking. This paste is so fluid, that the loaves cannot preserve their form before they have been exposed to the heat of the oven. For the second baking, after having mixed the quantity of flour necessary, by kneading it, they add the paste reserved from the former baking, and, when the mass is finished, they cut off a part weighing 80 lbs., and thus they proceed a third time, a fourth, and so on, until they have made twelve bakings. They thus continue to work for several days together, only they modify it after every fourth baking, by adding what they term a young leaven to the paste which each baking had impaired or weakened. If they would introduce into the paste either salt or yeast; they thin it in a proper manner with water, which contains yeast or salt in solution. They also use yeast for the soft bread. A quarter of a pound of the yeast from beer is equal to 8 lbs. of the paste leaven; so that 4 ounces of yeast are equivalent to 20 lbs. of the paste. The paste in which they have mixed the yeast, must not, however, be mixed with that containing leaven.

In France, they estimate the consumption of bread, including that used with soups, at 2 lbs. and a quarter per person; whilst, in England, it is not quite 13 ounces.—[*Arcana of Science and Art.*

QUESTIONS ON LYCEUM No. 15.

At what time and in what place was Socrates born?

In what employment was his father?

Who gave Socrates the first opportunity of engaging in the pursuit of knowledge?

Under what instructer did he first prosecute his studies?

In what siege did Socrates distinguish himself as a soldier?

Upon which did Socrates place the highest value, learning or virtue?

What plan of instruction did Socrates pursue, didactic or instructive? Did he make it his object to *pour* knowledge into the minds of his pupils, or to lead them to procure it for themselves?

Who undertook to bring ridicule upon Socrates and his philosophy, and in what way?

What was the result of these attempts at ridicule upon Socrates?

What accusation was brought against Socrates, to produce his ruin; and by whom was it brought?

What part of Italy is noted for the manufactory of straw bonnets, and by whom are they manufactured?

Does the study of nature tend to degrade or elevate our ideas of the Author of nature?

Which gives the most dignity to science, viewing it merely as a set of abstract principles, or as the work of a Divine Author, designed for the production of happiness?

Does Natural History occupy too high or too low a place in our systems of Education?

What substance in granite rocks tends to produce their decay?

How is the kaolin, or porcelain clay, produced?

Does any thing as it comes from the hands of the Creator, bear the marks of imperfection, or of evil design?

Does any thing come into the hands of men, which is not abused so as to produce evil?

In what way are the atmosphere and ocean abused?

What are some of the abuses of iron?

How is the vegetable kingdom abused?

How do men abuse themselves, and which do they abuse most, their physical, their intellectual, or their moral nature?

How are literary institutions abused?

What are some of the abuses of religious institutions, and of Christianity?

Where does selfishness produce the most mischief, in associations or among individuals?

Which Lyceums have uniformly been most prosperous, those which were selfish, or those which acted upon a principle of benevolence?

How many public associations for mutual improvement are there in Boston, and do they increase or diminish the social circles of intellectual improvement?

Which are most republican, social Lyceums, or those upon a large plan?

Towards what subjects may politicians direct their combined efforts for the common good of the country?

By what means can Lyceum buildings be erected in all the towns in all the states?

In what object could editors and the friends of education generally unite, more for the common good of our Republic than in forwarding the erection of Lyceums throughout the country?

What is stated by Malthus and Chalmers as the cause of poverty?

What does Dr. Chalmers suppose is the only means for removing poverty or preventing its evils?

What traits of character have Indians superior to those of civilized men?

What is the last stage of fermentation?

Upon what kind of matter does this stage of fermentation act, animal or vegetable, or both?

What substance always results from animal fermentation?

What are some of the essential requisites for carrying on fermentation?

What degree of heat is essential to the process of fermentation?

What substances are used for making gas for lights?

How many cubic feet of gas can be made from a chaldron of coal?

What is the size of a tree growing in Mexico, on the road from Oaxaca to Guatamala?

What other large trees in Mexico?

What is the great object of fructification in plants and animals?